

Dodge (W. T.)

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KNEE-JOINT, WITH ILLUSTRATIVE CASES.

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**THE TREATMENT OF SUPPURATION OF THE
KNEE-JOINT, WITH ILLUSTRATIVE CASES.¹**

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THIS article is limited to the consideration of the prevention and treatment of suppurative synovitis, and will not include the discussion of epiphyseal osteitis or tuberculous synovitis. The subject of knee-joint diseases, especially the treatment of suppuration, and the prevention of that occurrence after injuries to the joint, is an interesting one to every practitioner, and one that should be thoroughly understood by everybody who practises the healing art. I have no doubt that everyone who has had experience in surgery is sufficiently familiar with the principles of the modern treatment of this affection, but I know that a great many general practitioners, who are thoroughly qualified for the general practice of medicine, make very serious mistakes when suddenly called upon to treat a recent injury of the knee-joint; and many of them are wholly at sea when confronted with a joint full of pus.

I have prepared this paper with the hope of provoking a discussion of this subject that will

¹ Read before the Michigan State Medical Society, May 5, 1892.

attract the attention of the general practitioners, who do not see many surgical cases, but who are generally first called to attend instances of simple wounds of the knee, and who may generally prevent the occurrence of suppuration in such cases, if they but apply the principles of aseptic surgery and enjoin absolute rest. As the knee-joint is the largest and most exposed joint in the body, it is very frequently injured, and unless wounds penetrating it are promptly and correctly treated, suppuration is sure to ensue. An incised wound of the joint should be thoroughly cleansed, and closed at once by means of deep catgut sutures. Aseptic dressings should then be applied, and the joint placed at absolute rest for several days. Punctured wounds should be enlarged, thus converting them into incised ones, when they may be treated as such.

CASE I.—Mr. C. L. was admitted into the Mercy Hospital on February 14, 1891, with a cut at the outer and lower angle of the right knee, penetrating the capsule, from which the synovial fluid was freely flowing. The injury had been received on the previous day, and the man had walked considerably subsequently. The joint was much swollen, and he was suffering from a great deal of pain. I washed the wound thoroughly with bichloride solution, and then closed it with deep catgut sutures. The usual bichloride gauze dressing was applied, the joint immobilized by means of a posterior splint, and the patient placed in bed. In three days the wound was found to be healed, and in a week the patient was discharged as cured.

CASE II.—Mr. J., a driver of a delivery wagon. on February 1, 1892, fell on a nail, which pene-

trated the knee-joint at the outer and lower angle of the patella. He removed the nail, and continued working until the following day, when the great pain and swelling brought him to my office for relief. I introduced a director into the opening made by the nail, and found it to pass directly into the joint. I enlarged the opening freely, and then treated it according to the method described in Case I. The patient had no further pain, and resumed work in one week.

The principles of the treatment of suppurative synovitis are drainage, irrigation, and rest.

The best description of the principles involved in establishing drainage of the knee-joint that I have been able to find is in the *Reference Handbook of the Medical Sciences*, from which I quote: "If the leg be extended and the muscles of the thigh be relaxed, all portions of the joint-cavity are then quite freely communicable with each other. . . . As soon, however, as flexion of the leg is begun, the patella is brought in contact with the articular surface of the femur, and the greater the degree of flexion the firmer will be the apposition of their articular surfaces; so that, when the limb is flexed at a right angle the joint-cavity will be practically, although not completely, divided into two cavities, one behind and below the patella, the other above it. With the limb in this position it is not possible to thoroughly wash out either cavity by way of the other.

"When the limb is extended the upper synovial prolongation of the joint extends often four or five inches above the patella, beneath the tendons of the

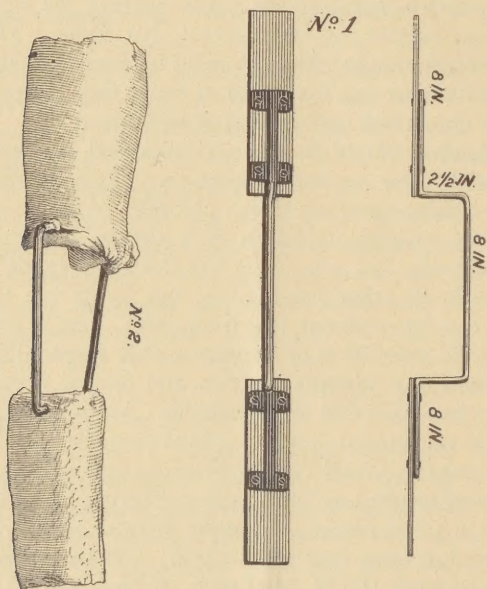
quadriceps extensor, and connects with the main joint-cavity by a free opening, which at times is much constricted. As the leg is flexed this pouch is continually drawn down, until, with the limb fully flexed, it is located at the upward limit of the articular cartilage at the lower end of the femur; therefore, when this pouch is to be opened at its uppermost limit the leg must be fully extended. At the posterior aspect of the joint-cavity each condyle of the femur rests in a cup-shaped depression of the ligamentous tissues, and each one should be drained independently. The synovial membrane also surrounds the upper end of the tibia and the lower portions of the outer surfaces of the condyles of the femur, and in the recesses thus formed, unless unusual care be taken, inflammatory products may collect and decompose.

“In order to prepare for the thorough washing out and drainage of the knee-joint, the leg must be fully extended, and through an incision made at one side of the patella the index-finger of the operator should be introduced into the joint-cavity, and pushed upward beneath the patella into the mouth of the submuscular prolongation of the synovial membrane, the neck of which is stretched or divided if it be too narrow to admit the ready entrance of the finger, which is carried beneath the vasti muscles to the uppermost limits of the sac; and at these points the drainage-tubes are carried through to the antero-lateral surfaces of the thigh. The cavity above the patella should be additionally drained by tubes passed into it at either side of the tendon of the quadriceps extensor, close to the upper end of

the patella. The remaining part of the cavity is drained through its anterior and posterior portions. The anterior openings are made beneath the ligamentum patellæ, at the apex of that bone. The posterior drainage-tubes are passed between the hamstring tendons and the bones in front, into the posterior condyloid pockets before mentioned."

Irrigation should be thoroughly carried out every day with some antiseptic solution. My preference is for a solution of mercuric chloride of 1 : 2000, but any antiseptic solution will answer. Hydrogen dioxide is a very valuable cleansing agent in this as in all other pus-cavities, and by its use the joint can be rendered free from pus. Rest is procured by some form of apparatus that immobilizes the joint in a straight position and affords opportunity for inspection and treatment. Any one of the several varieties of bracket splints described in the text-books will fulfil these indications very well ; but the most simple and inexpensive one that has come under my observation has never heretofore, to my knowledge, been described in print, and was devised by my friend, Dr. H. M. Leach, of Saginaw. The accompanying illustrations give a clear idea of the splints and their method of application to the leg by means of plaster-of-Paris. They can be made in a short time by any blacksmith. They are also very useful in the treatment of compound fractures of the leg. If the fracture is near the ankle, the splints are bent at one end at a right angle and attached to the sides of the foot. It will be seen that when they are in place the limb can be handled, irrigated, and

the dressing applied without causing pain to the patient.



The following cases illustrate the results of the foregoing method of treatment :

CASE III.—A. R., male, aged fourteen years, was admitted into the Mercy Hospital on November 28, 1890. Several weeks previously he had received an injury to his left heel, which resulted in suppuration. I found a bladder of pus hanging from his heel, and learned that he was having rigors and a fever of 105° F. The pus was evacuated and the abscess irrigated, but the rigors continued, and suppuration

of the right knee occurred. Two days after his admission, with the assistance of Dr. Burkart, I removed the entire left os calcis, it being completely destroyed by the suppuration, and made free openings into the right knee-joint, irrigated it thoroughly with bichloride solution of 1 : 2000, introduced eight drainage-tubes, and put the leg up in bracket splints. In introducing the drainage-tubes I explored with my finger, and placed the end of a tube in every pocket in which there was any possibility of pus accumulating. The patient had no further rigors, and the temperature came down to 100° F., where it remained several weeks, and then gradually approached the normal. Daily irrigation with a 1 : 2000 bichloride solution was practised, and at the end of three weeks the patient was removed to his home, where the treatment was continued by the family physician, who recently reported to me that both the knee and the ankle had healed perfectly, and that the boy had good use of both limbs, with considerable motion in the diseased knee.

CASE IV.—I saw this patient in January, 1891, in consultation with Dr. John Snyder, of Mecosta, who has kindly furnished me with the following history of the case. When I saw the patient his physician had established perfect drainage, and I did nothing but approve of his treatment and recommend the application of bracket splints. “Mr. W. H., while chopping, cut into the left knee-joint, just missing the upper outer angle of the patella. He remained in the camp eight days, during which time nearly everything was applied to the wound, including cow manure. He continued getting worse until the ninth day, when he came home and consulted me. He had a temperature of 105° F., with all the terrible depression following a septic inflammation in the knee. The odor of the discharge from the

wound was simply indescribable. He had severe pain, especially upon the slightest motion. I made free openings into the joint, introduced three large drainage tubes, and irrigated with a 1 : 2000 bichloride solution. After this procedure his temperature fell to $101\frac{1}{2}^{\circ}$, and remained so for three days, when three more drainage tubes were introduced and the limb put up in bracket splints. The joint was then perfectly drained, and his temperature fell to 99° F., at which point it remained for eight days, when it became normal. The joint was irrigated every other day with the 1 : 2000 bichloride solution. In four weeks the knee was perfectly healed. He can now (March, 1892) walk without a limp, and can bend the joint at an angle of forty-five degrees."

Dr. Snyder deserves much credit for his successful treatment of this serious case, as the difficulties attending the treatment of such a case in a private house many miles in the country are much greater than in a hospital.

CASE V.—H. L., a boy, aged twelve years, on September 1, 1891, received a cut on the left knee with an axe, and was taken immediately to his local physician, who is generally respected as a competent physician, but who has had no experience in surgery. The doctor sewed up the wound without making any special attempt to procure asepsis, and sent the lad home without giving any instructions whatever concerning his future care. The boy continued to move around as usual for several days, when the joint became so much swollen that he was forced to remain quiet. One week after the injury he was admitted into the Mercy Hospital, when I found the joint filled with pus, and the patient suffering from pain, rigors, and a fever of

103°. With Dr. Burkart's assistance, I opened the joint, irrigated, introduced drainage-tubes, and put the leg in bracket splints, as previously described. The improvement was immediate and continuous, and the boy was discharged in six weeks, cured. I examined him in March last, and found him in good health, with a useful leg, the knee-joint being freely movable.

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